The Ordovician–Silurian boundary in Poland

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Synopsis

Outcrops in the Holy Cross Mountains and Sudetes, as well as boreholes in the Polish lowlands, show Ordovician–Silurian boundary sediments to be variably developed or sometimes absent. The *Hirnantia* fauna is developed, but most other rocks are in graptolitic facies.

Ordovician–Silurian boundary beds have been recognized in Poland both in outcrops and in boreholes. However, despite abundant documentation obtained from both types of sections as well as intensive investigations carried out, the boundary in Poland is still inadequately known. This is mainly because of the presence of many sedimentary gaps in the known sections, which are a result of the Taconic orogenic phase, and also because of the lack of good index fossils. In consequence, this boundary is not sharply defined in the Polish profiles, which makes good correlation with the adjacent regions difficult (Teller 1969).

The Ordovician–Silurian boundary beds outcrop in Poland only in the Holy Cross Mountains and in the Sudetes. In the Bardo Range of the Sudetes (Teller 1962) there are no fossils known from near the junction, so the boundary has been arbitrarily designated by the presence of Lower Llandovery graptolites in black siliceous shale among the liddites The upper Ordovician sediments appear to be represented in this area by alternating beds of sandstone and shale without fossils which underlie the Silurian liddites. The Ordovician–Silurian boundary has been put at the contact of these two formations, but it is not known for certain whether or not the clastic Ordovician corresponds to the uppermost Ashgill.

In the Holy Cross Mountains, the boundary beds are known to occur in the Zalesie profile (Kielan 1956, 1957; Temple 1965), in the southern limb of the Bardo syncline in the Kielce region. The uppermost Ashgill silty beds contain a *Hirnantia* fauna with *Mucronaspis mucronata* Brongniart), *M. olini* Temple, *Dalmanella testudinaria* (Dalman), *Hirnantia sagittifera* (M'Coy) and *Eostropheodonta hirnantensis* (M'Coy) amongst others, and are covered by black shales with *Akidograptus acuminatus* at their base, accompanied by *Climacograptus scalaris normalis* and *A. ascensus*, indicating the *acuminatus* Zone.

Thus the boundary separates the Upper Ashgill siltstone formation, containing a *Hirnantia* fauna, from the Lower Llandovery black shale formation with graptolites. This rapid change in facies suggests a lack of sedimentary continuity particularly since there are no graptolites in the uppermost Ashgill. In profiles in other parts of the world, the *Hirnautia* fauna (Cocks 1985) is generally older, or is to be found below the Ordovician *Glyptograptus persculptus* Biozone, the top of which is now taken as the boundary between the Ordovician and the Silurian.

In many other sections in the Holy Cross Mountains (Tomczyk 1962; Bednarczyk 1973) a sedimentary gap is noted at this boundary. This gap embraces the entire Upper and partly the top of the Lower Ashgill as well as the lowermost Llandovery, and appears to be a result of the Taconic phase of orogeny.

In the Polish Lowlands, the Ordovician–Silurian boundary beds show great facies variability (Modliński 1973). In many boreholes, sedimentary gaps embrace various time spans and a change of facies toward a marly-arenaceous one is noted, which appears to indicate a gradual regression. Graptolites have only been found in the deeper parts of the platform slope clayey facies, including the Upper Ashgill Biozone of *Glyptograptus persculptus* and the Lower Llandovery *A. acuminatus* Zone, for example in the Lebork borehole (Tomczyk 1965).

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